

## **FAST POSITIONING OF DISK DRIVES AND OTHER PHYSICAL SYSTEMS**

### **Abstract of the Disclosure**

5 A method useful to change a system's output from one value to another  
within a prescribed time-interval in an optimal manner using optimization criteria  
such as minimal time (e.g., to increase throughput) or minimal energy (e.g., to reduce  
heat dissipation and reduce induced vibrations). Optimal design of maneuvers (such  
as fast seek and scanning) that rapidly change the output from one value to another,  
arise in flexible structure applications, including rapidly positioning the end-point of  
10 large-scale space manipulators, positioning of read/write heads of disk-drive servo  
systems, which are relatively medium-scale flexible structures, and nano-scale  
positioning and manipulation using relatively small-scale piezo actuators.  
Maintaining a position of an element constant outside of the transition time-interval is  
critical in many applications. For example, in disk-drive applications, read and write  
15 operations cannot be performed (before and after the output transition) if the output  
position is not precisely maintained at a desired track.